

Report of the Director  
of the  
New Hampshire  
Agricultural Experiment Station

Station Bulletin 467

November 1959

AGRICULTURAL EXPERIMENT STATION  
UNIVERSITY OF NEW HAMPSHIRE  
DURHAM, NEW HAMPSHIRE

## Foreword

This is the 70th annual report of the Director of the New Hampshire Agricultural Experiment Station. It contains a list of all projects which were active during any part of the fiscal year ending June 30, 1958, as well as the leaders of each project. Also included are lists of the members of the staff, titles and authors of publications, a financial statement, and a brief review of services performed for the State of New Hampshire and for the general public.

Publications of the Agricultural Experiment Station consist of bulletins, reprints of articles published in scientific journals, mimeographed reports of research, and the Progress Report. A printed list of available publications may be obtained from the Mail Clerk. Citizens of the state can obtain copies of available publications without cost.

On January 1, 1958, all agricultural activities at the University of New Hampshire were consolidated under the College of Agriculture. Previous to this time the Cooperative Extension Service had functioned as a separate unit. Under the reorganization, Dean H. C. Grinnell relinquished the directorship of the Agricultural Experiment Station, a position he had held since 1950, to assume the added responsibilities of the deanship. S. W. Hoitt became Director of the Cooperative Extension Service, M. C. Richards, Associate Dean in charge of resident instruction in agriculture, and the writer became Director of the Agricultural Experiment Station. These three positions report directly to the Dean of the College of Agriculture. Tribute is paid to Dean Grinnell for his leadership in and untiring devotion to agricultural research on the University of New Hampshire campus. He has established a difficult path for a successor to follow.

Finally, I want to emphasize the reasons for conducting research in the New Hampshire Agricultural Experiment Station. As with any other industry, agriculture and forestry can continue to make a significant contribution to the economy of the State of New Hampshire only through the help of a strong and vigorous research program. If we do not hold our position in competition with other states and other areas, every citizen of the state will suffer. Agricultural research serves everyone, not just farmers. It results in plentiful food at reasonable prices, improved human nutrition, more efficient use of our land and water resources for recreation, lumber production and farm use, and a more prosperous economy. Research is an investment in the future.

H. A. KEENER  
*Director*

## Active Research Projects

July 1, 1957 — June 30, 1958

### Administration

- H-111 General Administration of Federal-Grant Fund Research. H. C. Grinnell, H. A. Keener.
- H-112 Planning and Coordination of Cooperative Research. H. C. Grinnell, H. A. Keener.
- H-113 The Planning and Coordination of Research Under Regional Project NE-18, Economics of Forage Production and Utilization. H. C. Grinnell.
- H-115 The Planning and Coordination of Research Under Regional Project NE-33, Economics of Irrigation on Northeastern Farms. H. C. Grinnell, H. A. Keener.

### Agricultural Economics

- H-95 Alternative Markets and Prices for New Hampshire Milk Produced in Excess of Fluid Requirements with Particular Reference to the Boston Milkshed. J. R. Bowring.
- NEM-13
- H-96 The Extent of Migration and Its Effect on Rural Communities in NE-31 New Hampshire. J. R. Bowring, O. B. Durgin.
- H-101 Opportunities for the Small Nurseryman in Developing Market NEM-15 Outlets. L. A. Dougherty.
- H-106 Competitive Position of the New England Apple Industry with Particular Reference to New Hampshire. W. H. Drew.
- H-109 Economic Effects of Changes in Retail Food Marketing Services NEM-17 W. H. Drew.
- H-127 Impact of Alternative Methods of Marketing Poultry Products on NEM-21 Resource Requirements. W. F. Henry, E. T. Bardwell.
- H-128 Characteristics of Low Production and Low Income Farms in New Hampshire. O. B. Durgin.
- H-129 The Costs of Processing and Distributing Dairy Products in New Hampshire. J. R. Bowring. (Closed 6-30-58.)
- S-44 Cost Reduction in Dairying. W. F. Henry.
- S-61 Evaluation of Methods of Improving in Decision Making. O. B. Durgin.
- S-72 Economic Evaluation of Alternative Production Practices on Specialized Poultry Farms in New Hampshire. W. F. Henry.

### Agricultural Engineering

- H-107 Agricultural Climatology of New England. J. J. Kolega, R. H. NE-35 Owens, R. S. Palmer.
- H-103 Effect of Tractor Weight on Soil Compaction. G. L. Byers.
- S-65 Efficiency of Forage Harvesting. G. L. Byers, G. E. Frick.

- S-66      Developing Labor Saving Equipment for Agriculture. P. Gilman.  
 S-73      Engineering Studies of Poultry Housing as Related to Equipment,  
 Function and Structural Needs. J. J. Kolega, R. C. Ringrose.

### **Agronomy**

- H-32      The Adaptation of New Potato Varieties. P. T. Blood. (Closed  
 8-15-57.)  
 H-33      Variety Trials of Grain Crops for Forage and Grain Yields. L. J.  
 Higgins. (Closed 8-15-57.)  
 H-69      The Influence of Fertilization and Stage of Cutting on the Yield,  
 Persistency and Protein Content of Bromegrass (*Bromus inermis*).  
 N. K. Peterson, P. T. Blood.  
 H-83      The Influence of Deep Tillage and Fertilizer Placement on Soil  
 NE-11      Structure and Crop Production on Soils With Compact Sub-  
 soils. A. B. Prince.  
 H-93      Evaluation of Soil Physical Conditions that are Favorable to  
 NE-11      the Yield of Crops. A. B. Prince.  
 H-94      The Adaptation and Production of Regionally Developed Selec-  
 NE-28      tions and Strains of Smooth Bromegrass as Related to Morphologic  
 and Physiologic Characteristics. G. M. Dunn.  
 H-99      Water and Fertilizer Requirements of Selected Crops and Soils  
 NE-22      as Related to Supplemental Irrigation. A. B. Prince, R. S. Palmer,  
 P. T. Blood.  
 H-105      The Improvement of White Clover. G. M. Dunn, R. A. Kilpatrick.  
 H-116      Improvement of Smooth Bromegrass, Red Clover and Alfalfa.  
 G. M. Dunn, L. J. Higgins.  
 S-43      A Survey of the Soils of New Hampshire. A. B. Prince.  
 S-54      Soil Fertility Studies of Forage Crops. A. B. Prince.  
 S-74      The Adaptation and Introduction of New Potato Varieties. P. T.  
 Blood.  
 S-75      Variety Trials of Grain Crops for Forage and Grain Yields.  
 L. J. Higgins.

### **Bacteriology**

- H-62      Investigations on the Microorganisms of the Bovine Rumen. W. A.  
 Ayers.  
 H-120      Diagnosis and Control of Bovine Mastitis. L. W. Slanetz, F. E.  
 Allen.

### **Biochemistry**

- H-47      The Hemicellulose of Forage Crops. D. G. Routley.  
 H-71      The Effect of Soil Type and Mineral Additions on the Mineral  
 Content of Clover and Timothy. G. P. Percival.  
 H-77      Analysis of Forage Samples. G. P. Percival.  
 H-124      Influence of the Ration of Laying Hens on the Nutritive Value  
 of the Eggs. A. E. Teeri, M. E. Loughlin.  
 S-52      The Nutritive Value of Fish and Other Marine Products. A. E.  
 Teeri, M. E. Loughlin.

## Botany

- H-44 Propagation of Woody Plants. S. Dunn, R. Eggert.  
H-57 Fungicide Investigations. A. E. Rich, R. Eggert, W. W. Smith.  
H-63 Virus Diseases of Strawberries in New Hampshire. A. E. Rich, E. M. Meader.  
H-68 The Effects on Vegetation of Weed-Control Measures Applied to Woody Plant Areas. A. R. Hodgdon.  
H-90 Light and Temperature Effects on Phytotoxicity with Respect to  
NE-42 Herbicides. S. Dunn.  
H-91 Effects of Light Quality on Plant Growth. S. Dunn.  
H-103 Anatomy and Morphology of the Vegetative Organs of Representative Rubus Species. C. G. Nast.  
H-119 Virus Diseases of Fruit Trees. A. E. Rich, W. W. Smith.  
NE-14  
H-121 Testing Tomato Varieties and Selections for Resistance to the Early Blight (*Alternaria solani*) and Late Blight (*Phytophthora infestans*) Pathogens. A. E. Rich, A. F. Yeager.  
S-30 The Flora of New Hampshire. A. R. Hodgdon.  
S-46 Plant Disease Investigations. A. E. Rich.

## Dairy Science

- H-67 The Relation of Seminal Fluid Fructose Levels to Factors Affecting Breeding Efficiency. C. H. Boynton. (Closed 6-30-58.)  
H-76 Causes of Reproductive Failure in Cattle Fed Ladino Clover Mixtures. H. A. Keener, F. E. Allen. (Closed 6-30-58.)  
H-85 Package Milk Vending Machines as a Means of Increasing Fluid Milk Sales. H. C. Moore. (Closed 6-30-58.)  
H-102 The Nutritive Evaluation of Forage for Dairy Cattle. N. F. Colovos, H. A. Keener, N. K. Peterson, P. T. Blood, H. A. Davis, NE-24 A. E. Teeri.  
H-126 The Maximum Use of Roughage in Feeding Dairy Cattle. H. A. Keener, N. F. Colovos.  
S-67 The Influence of Herd Management Practices on Milk Production, Efficiency of Reproduction and Herd Replacement Maintenance. K. S. Morrow.

## Entomology

- H-43 Factors Affecting the Action of Acaricides. R. L. Blickle, W. J. Morse.  
H-114 Relation of Honeybee to Horticultural Crops in N. H. W. R. Lee.  
H-122 Testing New Organic Pesticides Under N. H. Conditions. J. G. Conklin, R. L. Blickle, W. J. Morse.  
S-34 Insect Record. J. G. Conklin, R. L. Blickle, W. J. Morse.  
S-35 Control of Apple Maggot and Certain Other Economic Insects. J. G. Conklin.  
S-36 Studies on the Ecology of European Saw-Fly. J. G. Conklin.

## Forestry

- H-70 The Relationship of Growth of White Pine in N. H. to Selected Environmental Characteristics. B. Husch.
- H-82 Marketing Forest Products in N. H. L. C. Swain, O. P. Wallace,  
NEM-6 (Closed 6-30-58.)
- H-89 The Utilization of Products from Chemically Treated Trees. L. C. Swain, O. P. Wallace.
- H-104 Site Preparation for Reproduction of Eastern White Pine. H. W. Hocker.
- H-110 Stimulation of Seed Production of White Pine (*Pinus strobus* L.)  
NE-27 H. W. Hocker.
- S-1 Reproduction Studies. H. W. Hocker.
- S-51 Relation of Available Labor to Woodlot Income on N. H. Dairy Farms. O. P. Wallace.
- S-70 Marketing Eastern White Pine Lumber from Maine and N. H. Saw Mills, O. P. Wallace.

## Home Economics

- H-97 Color Changes in White Dacron Blouses. (Closed 1-1-58.)  
NE-19
- H-117 The Effect of Isocaloric Exchanges Between Protein and Fat on  
NE-37 the Metabolic Interplay of Specific Blood Nutrients. A. L. Smith,  
S. R. Shimer, C. H. Howarth.

## Horticulture

- H-37 Variety Tests of Fruits and Vegetables. R. Eggert, A. F. Yeager,  
J. Kitchin.
- H-38 Improvement of Ornamental Plants. E. B. Risley, A. F. Yeager,  
E. M. Meader, R. B. Pike.
- H-39 Cultural Studies with Horticultural Crops. R. Eggert.
- H-40 Temperature Relations in Horticultural Plants Under N. H. Con-  
ditions. R. Eggert, L. P. Latimer. (Closed 6-30-58.)
- H-41 Nutritional Studies with Horticultural Plants. R. Eggert, L. P.  
Latimer, G. P. Percival.
- H-54 Breeding Better Vegetables for New Hampshire. E. M. Meader,  
A. F. Yeager, A. E. Rich, A. L. Smith.
- H-56 The Development, Improvement and Maintenance of Blueberry  
Fields. W. W. Smith, E. M. Meader, J. G. Conklin, A. R. Hodgdon.
- H-64 The use of Rootstocks and Interstocks as a Means of Securing  
Smaller, Hardier, and More Productive Apple Trees. W. W. Smith.
- H-74 Breeding Improved Fruits for New Hampshire. A. F. Yeager,  
E. M. Meader, A. E. Rich, A. L. Smith.
- H-87 The Testing and Utilization of New Plant Materials in New Hamp-  
NE-9 shire. A. F. Yeager, E. M. Meader, G. M. Dunn, A. E. Rich.
- S-38 Nut Improvement. A. F. Yeager, E. M. Meader.
- S-69 The Effect of Rootstock and Preplanting Soil Treatments on the  
Up-take of Nutrients by Apple Trees. R. Eggert.



## Poultry Science

- H-55 Efficiency of Feed Utilization in Poultry Production. R. C. Ringrose.
- H-78 The Isolation and Control of Chronic Respiratory Disease in Chickens and the Relationship to the Satisfactory Immunization with Newcastle Disease and Infectious Bronchitis Vaccines. W. R. Dunlop, J. W. Gill, R. G. Strout.
- NE-5
- H-81 Factors Influencing the Market Quality of Eggs on New Hampshire Farms. W. C. Skoglund.
- H-88 The Influence of Light upon Feathering Condition, Weight Gains, NE-8 Feed Conversion and Mortality in Broilers. W. C. Skoglund.
- H-92 Recurrent Selection vs. Closed Flock Selection for Improving NE-6 Broiler Qualities. W. M. Collins. (Closed 6-30-58.)
- H-118 Control of Poultry Pathogens. W. R. Dunlop, S. C. Thayer, R. G. Strout, J. W. Gill.
- H-123 Basic Problems in Random Sample Testing of Broiler Strains of Chickens. W. M. Collins, W. C. Skoglund.
- H-125 The Inheritance of Feed Utilization in Poultry. W. M. Collins.
- S-55 Factors Influencing Sexual Maturity of Pullets. R. C. Ringrose, W. S. Reed.
- S-71 Control of Avian Coccidiosis. R. G. Strout, W. C. Skoglund, W. R. Dunlop.

## State Services

### Inspection of Fertilizers and Feedingstuffs

Official samples of fertilizers and feedingstuffs as submitted by the State Department of Agriculture have been analyzed.

Fertilizers: Of 173 samples submitted, 108 met the guarantee in all respects. Analysis for nitrogen, phosphoric acid, potash, total magnesium, water soluble magnesium, and boron were made when guarantees for these materials were made. Penalties were assessed by the State Department of Agriculture on 27 different lots of fertilizers. The manufacturers in general are doing a good job in supplying the plant nutrient needs of New Hampshire farmers and home owners. Detailed analyses of these samples are published in Bulletin 446 of this Station.

Feeds: A total of 703 official samples of feedingstuffs were submitted for analysis. Of these, 78 were pet foods, mostly canned cat and dog foods. Guarantees were generally met and when deficiencies occurred they were usually slight. Only 10.4 percent were deficient in protein, 5.9 percent were deficient in fat, and 7.1 percent carried an excess of crude fiber. Of the samples analyzed, 75 were from bulk delivery lots and 120 were drawn on New Hampshire farms. Also 83 mixed feed or ingredients and 30 pet food lots were found to be unregistered at the time of sampling. Detailed results are published in Bulletin 450.

A constant check is maintained on the analytical methods used. Two check sample programs are participated in by this laboratory. Over 100 laboratories throughout the country take part in these programs. The laboratory also is asked by manufacturers to supply a part of official samples for checking purposes in many cases when a deficiency is reported. In order to continue in good standing, it is necessary that the procedures of analysis be continually checked.

A total of 55 samples of miscellaneous materials such as hay, silage, home mixtures, etc., were examined for residents of the state and reported directly to the person concerned.

H. A. DAVIS

## Soil Testing

During the year residents of the state submitted 4,279 soil samples for analysis of pH and available nutrients. This work entailed 29,953 determinations. Two hundred and thirteen samples from greenhouses were tested for soluble salts. Ten peat and muck samples submitted for identification were analyzed for moisture content, organic matter content, and for pH value, and suggestions were made as to their commercial value. Seventeen samples were submitted by veterinarians to be tested for specific poisons. This program was carried out in cooperation with the Cooperative Extension Service.

## Seed Inspection

Seed inspection work for the New Hampshire State Department of Agriculture was conducted during the past year. The results of the tests of 744 official samples collected by the state seed inspectors throughout the state are reported in Station Bulletin 454. In addition, 902 private samples were sent in by seed dealers and farmers, making a total of 1,646 samples handled at the laboratory.

The laboratory took part in the referee testing of samples sent out to all official seed testing laboratories in the United States and Canada.

BESSIE G. SANBORN

## Diagnostic Service Performed at the Poultry Laboratory

From January 1, 1957, to December 31, 1957, a total of 6,785 specimens of all kinds were submitted to the Poultry Laboratory for diagnosis. These represented 2,948 cases.

A total of 5,315 chicken specimens were examined, 65 turkeys, and 3 miscellaneous birds. In addition, 38 cases consisting of 67 specimens from various animals also were handled by the laboratory personnel. There were 287 cases (813 samples) of blood samples submitted for immunity tests.

A. C. CORBETT  
W. R. DUNLOP  
R. G. STROUT  
F. E. ALLEN



## **Infectious Bronchitis Virus**

The Poultry Laboratory has continued to grow infectious bronchitis virus on embryonating eggs, and after being tested for purity and potency it is sold to poultrymen of the state for inoculation of their susceptible birds. During the year, 56 lots of this virus were supplied to New Hampshire poultrymen.

A. C. CORBETT  
F. E. ALLEN  
W. R. DUNLOP

## **Pullorum Testing**

Testing of poultry for Pullorum disease in the state is done by the Poultry Laboratory. During the year, 992,014 birds were tested by means of the tube agglutination test.

Of 271 flocks tested, none were found to harbor infection.

A. C. CORBETT  
F. E. ALLEN

## **New Hampshire Broiler Test**

The New Hampshire Broiler Test is managed by the Department of Poultry Science in cooperation with an advisory committee from the industry. It consisted of 30 pens of 250 chicks each. Three lots of birds are reared each year. Both commercial and experimental entries were entered in the test. Measurements recorded were 8 and 10 week weights, feed conversion, mortality, and dressing grades. The New Hampshire Broiler Test is considered one of the outstanding ones in the country and attracts entries not only from New Hampshire, but all parts of the country.

W. C. SKOGLUND

## **Dairy Bacteriological Testing**

During the year 648 Babcock milk test bottles and 37 pipettes were calibrated as required by law. In addition numerous samples of milk were tested for butterfat, total solids, and bacteria for dairymen of the state.

H. C. MOORE

# New Hampshire Agricultural Experiment Station Staff

June 30, 1958

## Administration

HAROLD C. GRINNELL, PH.D., Dean of the College of Agriculture  
HARRY A. KEENER, PH.D., Director  
NORMAN W. MYERS, B.A., Treasurer  
W. KENT MARTLING, LL.B., Assistant Treasurer  
RUSSELL C. SMITH, B.A., Purchasing Assistant  
L. FRANKLIN HEALD, B.A., Editor  
HENRY W. CORROW, JR., B.S., Associate Editor for Agriculture and Home Economics  
THELMA BRACKETT, A.B., Librarian  
WILLIAM E. MCGRATH, A.M.L.S., Librarian, Plant and Animal Sciences Library

## Agricultural Economics

WILLIAM F. HENRY, M.S., Economist  
JAMES R. BOWRING, PH.D., Associate Economist  
WILLIAM H. DREW, M.S., Associate Economist  
LAWRENCE A. DOUGHERTY, B.S., Assistant Economist  
OWEN DURGIN, M.A., Sociologist  
GEORGE E. FRICK, M.S., Economist, A.R.S., U.S.D.A.  
GEORGE B. ROGERS, M.S., Economist, A.M.S., U.S.D.A.  
EDWIN T. BARDWELL, B.S., Economist, A.M.S., U.S.D.A.  
RICHARD SMITH, B.S., Graduate Research Assistant

## Agricultural Engineering

JOHN J. KOLEGA, M.S., Agricultural Engineer  
GORDON L. BYERS, M.S., Associate Agricultural Engineer  
PAUL A. GILMAN, M.S., Assistant Agricultural Engineer  
ROBERT S. PALMER, M.S., Agricultural Engineer, A.R.S., U.S.D.A.

## Agronomy

ALLAN B. PRINCE, PH.D., Associate Soil Chemist  
LEROY J. HIGGINS, B.S., Associate Agronomist  
PAUL T. BLOOD, M.S., Associate Agronomist  
GERALD M. DUNN, PH.D., Associate Plant Breeder  
NOBEL K. PETERSON, PH.D., Associate Agronomist  
ROBERT F. LUCEY, M.S., Assistant Agronomist  
WALTER LYFORD, M.S., Sr. Soil Correlator, S.C.S., U.S.D.A.  
BESSIE C. SANBORN, Seed Analyst  
SADI A. TAMIMI, B.S., Graduate Research Assistant  
HSUEH-SHUN CHOW, B.S., Graduate Research Assistant  
YEN-SUN PUH, B.S., Graduate Research Assistant  
LESLIE HAYDEN, B.S., Departmental Technician

## Bacteriology

LAWRENCE W. SLANETZ, PH.D., Bacteriologist  
WILLIAM A. AYERS, PH.D., Assistant Bacteriologist  
FRED E. ALLEN, D.V.M., Veterinarian

CLARA H. BARTLEY, PH.D., Research Associate  
ALBERTA F. MENTER, Laboratory Technician I  
JUDYTH POBLENZ, B.S., Laboratory Technician II  
THEODORE TZIANABOS, B.A., Graduate Research Assistant  
JOSEPH MARELLI, Departmental Technician

## Biochemistry

ARTHUR E. TEERI, PH.D., Chemist  
STANLEY R. SHIMER, M.S., Associate Chemist  
GORDON P. PERCIVAL, M.S., Associate Chemist  
HENRY A. DAVIS, M.S., Associate Chemist  
MARGARET E. LOUGHLIN, M.S., Assistant Chemist  
DOUGLAS G. ROUTLEY, PH.D., Assistant Chemist  
DOROTHY JOSSELYN, Research Analyst I  
DAVID P. HANLON, B.A., Graduate Research Assistant  
RUTH S. FOWLER, B.S., Laboratory Technician II

## Botany

ALBION R. HODGDON, PH.D., Plant Taxonomist  
STUART DUNN, PH.D., Plant Physiologist  
\*CHARLOTTE G. NAST, PH.D., Morphologist  
AVERY E. RICH, PH.D., Plant Pathologist  
MATHIAS C. RICHARDS, PH.D., Mycologist  
RICHARD W. SCHREIBER, PH.D., Assistant Cytologist  
R. A. KILPATRICK, PH.D., Plant Pathologist, A.R.S., U.S.D.A.  
SANAT K. MAJUMDER, M.S., Graduate Research Assistant  
BEYOUNG H. KWACK, M.S., Graduate Research Assistant  
GEORGE WILLIAMS, B.S., Graduate Research Assistant  
ARIANNA HAMPTON, Laboratory Technician I

## Dairy Science

KENNETH S. MORROW, M.S., Dairy Husbandman  
HARRY A. KEENER, PH.D., Dairy Husbandman  
HERBERT C. MOORE, M.S., Associate Dairy Husbandman  
NICHOLAS F. COLOVOS, M.S., Animal Nutritionist  
C. HILTON BOYNTON, M.S., Associate Dairy Husbandman  
BURR CLARK, JR., B.S., Graduate Research Assistant  
WILLIAM W. FEASTER, B.S., Graduate Research Assistant  
JOHN E. VANDERVEEN, B.S., Graduate Research Assistant  
ANN PAUL HATCH, M.S., Research Analyst I

## Entomology

JAMES G. CONKLIN, PH.D., Entomologist  
ROBERT L. BLICKLE, PH.D., Entomologist  
WILLIAM R. LEE, JR., PH.D., Assistant Entomologist  
WALLACE J. MORSE, B.S., Research Analyst II

## Forestry

CLARK L. STEVENS, PH.D., Forester  
LEWIS C. SWAIN, M.F., Associate Forester  
BERTRAM HUSCH, PH.D., Associate Forester  
OLIVER WALLACE, PH.D., Assistant Forester  
HAROLD W. HOCKER, JR., D.FOR., Assistant Forester  
EDWIN C. WOODWARD, B.S., Graduate Research Assistant

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\* On leave 1957-1958.

## Home Economics

ANNA LIGHT SMITH, PH.D., Home Economist

## Horticulture

ALBERT F. YEAGER, PH.D., Horticulturist  
L. PHELPS LATIMER, PH.D., Associate Horticulturist  
ELWYN M. MEADER, M.S., Associate Horticulturist  
WILLIAM W. SMITH, PH.D., Associate Horticulturist  
RUSSELL EGGERT, M.S., Associate Horticulturist  
J. T. KITCHIN, PH.D., Associate Horticulturist  
EDWARD B. RISLEY, M.S., Assistant Horticulturist  
RADCLIFFE PIKE, M.S., Collaborator  
VIRGINIA WIEGAND, B.S., Graduate Research Assistant  
SHIN-AN YU, M.S., Graduate Research Assistant

## Poultry Science

WINTHROP C. SKOGLUND, M.S., Poultry Husbandman  
RICHARD C. RINGROSE, PH.D., Poultry Nutritionist  
FRED E. ALLEN, D.V.M., Veterinarian  
ALAN C. CORBETT, D.V.M., Pathologist  
WILLIAM R. DUNLOP, D.V.M., Research Pathologist  
WALTER M. COLLINS, M.S., Poultry Geneticist  
RICHARD G. STROUT, M.S., Assistant Pathologist  
JAMES W. GILL, PH.D., Microbiologist  
WALLIS S. RAND, Laboratory Assistant  
EMILY DONOVAN, Laboratory Technician I  
HARRIET N. FOGG, Laboratory Technician I  
BERTHA MANN, Laboratory Technician I  
KATHRYN MOORE, Laboratory Technician I  
ROSE THOMAS, Laboratory Technician I  
EDNA WOODWARD, Laboratory Technician I  
GRACE SULLIVAN, Laboratory Technician I  
SAMUEL MOYER, B.S., Research Technician  
STEPHEN THAYER, B.S., Graduate Research Assistant  
JERE BECKMAN, B.S., Graduate Research Assistant  
WILLIS S. REED, B.S., Graduate Research Assistant

## Changes in Personnel

### Additions to the Staff

CHOW, HSUEH-SHUN, Graduate Research Assistant, Department of Agronomy (February 1, 1958- ).  
FOWLER, RUTH S., Laboratory Technician II, Department of Biochemistry (July 1, 1957- ).  
GILL, JAMES W., Microbiologist, Department of Poultry Science (November 13, 1957- ).  
HANLON, DAVID PAUL, Graduate Research Assistant, Department of Biochemistry (September 1, 1957- ).  
HAMPTON, ARIANNA, Laboratory Technician I, Department of Botany (July 8, 1957- ).  
LUCEY, ROBERT F., Assistant Agronomist (March 10, 1958- ).  
POBLENZ, JUDYTH R., Laboratory Technician II, Department of Bacteriology (July 1, 1957- ).

- PUH, YEN-SUN, Graduate Research Assistant, Department of Agronomy (February 1, 1958- ).
- REED, WILLIS S., Graduate Research Assistant, Department of Poultry Science (February 1, 1958- ).
- ROUTLEY, DOUGLAS G., Assistant Chemist (August 20, 1957- ).
- SCHREIBER, RICHARD W., Assistant Botanist (September 1, 1957- ).
- SMITH, RICHARD, Graduate Research Assistant, Department of Agricultural Economics (February 1, 1958- ).
- WILLIAMS, GEORGE, Graduate Research Assistant, Department of Botany (July 1, 1957- ).

## Losses from Staff

- BARRAT, JOSEPH G., JR., Graduate Research Assistant, Department of Botany (September 1, 1955-August 31, 1957).
- FEASTER, WILLIAM, Graduate Research Assistant, Department of Dairy Science (July 1, 1956-June 30, 1958).
- LAVOIE, PAULINE, Research Analyst II, Department of Agronomy (July 1, 1956-June 13, 1958).
- MAJUMBER, SANAT K., Graduate Research Assistant, Department of Botany (February 1, 1955-June 30, 1958).
- MCCANN, MARCIA, Laboratory Technician I, Department of Biochemistry (October 1, 1956-June 5, 1958).
- TAMIMI, SADI, Graduate Research Assistant, Department of Agronomy (July 1, 1956-June 30, 1958).
- THAYER, STEPHEN, Graduate Research Assistant, Department of Poultry Science (July 1, 1956-June 30, 1958).
- TZIANABOS, THEODORE, Graduate Research Assistant, Department of Bacteriology (July 7, 1955-June 30, 1958).
- WIEGAND, VIRGINIA, Graduate Research Assistant, Department of Horticulture (September 1, 1956-June 30, 1958).
- WOODWARD, EDWIN C., Graduate Research Assistant, Department of Forestry (September 1, 1956-June 30, 1958).

## Publications

### Experiment Station Bulletins

- 443 *Inspection of Commercial Feedingstuffs*. H. A. DAVIS AND JEANNE BENJAMIN.
- 444 *Marketing New England Poultry. I. Characteristics of the Processing Industry*. GEORGE B. ROGERS, WILLIAM F. HENRY, ALFRED A. BROWN AND EDWIN T. BARDWELL.
- 445 *Results of Seed Tests for 1957*. BESSIE G. SANBORN.
- 446 *Inspection of Commercial Fertilizers*. H. A. DAVIS AND RUTH FOWLER.
- 447 *The Woody Plants of New Hampshire*. ALBION R. HODGDON AND FREDERICK L. STEELE.
- 448 *Breeding Better Fruits and Nuts*. A. F. YEAGER AND E. M. MEADER.
- 449 *Effects of Flood Control Projects on Agriculture. I. Reservoir Areas*. GEORGE B. ROGERS.

### Station Technical Bulletin

- 96 *The Effect of Three Color Genes Upon Red in the Surface Plumage of Heterozygous Dominant White Chickens*. F. L. CHERMS, JR., W. M. COLLINS AND W. C. SKOGLUND.

## Scientific Contributions

- 193 BLICKLE, R. L., W. J. MORSE, "New Hydroptilidae (Trichoptera) from New Hampshire." *Brooklyn Ent. Soc.* 52:48-50, 1957.
- 194 MACKAY, K. H., G. M. DUNN, "Crossing of Smooth Bromegrass, *Bromus inermis* Leyss, in the Greenhouse." *Agron. Jour.* 49:359-362, 1957.
- 196 TEERI, A. E., W. VIRCHOW, N. F. COLOVOS, F. GREELEY, "Blood Composition of White-Tailed Deer." *Jour. Mam.* 39:269-274, 1958.
- 197 KEENER, H. A., E. J. THACKER, "Growth Studies with Calves and Rabbits Fed Timothy Hay Grown on Heavily Fertilized Soils." *Jour. Dairy Sci.* 41:182-189, 1958.
- 199 LONSDALE, M. R., R. M. VONDELL, R. C. RINGROSE, "Debeaking at One Day of Age and the Feeding of Pellets to Broiler Chickens." *Poultry Science*. 36:565-571, 1957.
- 200 DUNLOP, W. R., R. G. STROUT, "State Wide Testing for PPLO Infection of Poultry." *Proc. 16th Annual Meeting U. S. Livestock Sanitary Assoc.*, 1957.
- 206 VONDELL, R. M., R. C. RINGROSE, "Debeaking at One Day of Age and Feeding of Pellets to Broiler Chickens. 2." *Poultry Sci.* 36:1310-1312, 1957.
- 207 COLLINS, W. M., W. HUBBARD, "Influence of Plumage Color on Hatching Ratio and Growth Rate in Chickens." *Poultry Sci.* 37:69-77, 1958.
- 208 MAJUMDER, S. K., S. DUNN, "Effect of Metal Chelates on Growth of Corn in Solution Cultures." *Plant Phys.* 33:166-169, 1958.
- 209 VONDELL, R. M., R. C. RINGROSE, "The Effect of Protein and Fat Levels and Calorie to Protein Ratio Upon Performance of Broilers." *Poultry Sci.* 37:148-151, 1958.
- 210 TEERI, A. E., P. G. SESIN, "Determination of Potassium in Blood Serum." *Amer. Jour. Clin. Path.* 29:86-89, 1958.
- 213 THAYER, S. C., R. G. STROUT, W. R. DUNLOP, "Observation on Infectious Synovitis." *Poultry Sci.* 37:449-454, 1958.
- 214 KILPATRICK, R. A., "Fungi Isolated from Ladino White Clover Seeds (*Trifolium Repens* L.) in New Hampshire." *Plant Dis. Rep.* 42:142-144, 1958.
- 215 KEENER, H. A., F. E. ALLEN, N. F. COLOVOS, A. C. PAUL, H. A. DAVIS, "Value of Adding Corn Silage and Limited Grain Ration for Dairy Heifers." *Jour. Dairy Sci.* 41:429-437, 1958.

## Progress Reports

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## Research Mimeographs

### Agricultural Economics

- 16 ROGERS, GEORGE B., EDWIN T. BARDWELL, DISTER L. DEOSS, "Declining Numbers of Live Poultry Dealers in New England; Causes and Effects."
- 17 DOUGHERTY, L. A. "Problems in Purchasing and Opportunities in Selling Irises."
- 18 DOUGHERTY, L. A., "Use of Color and Ornamentals by Motels and Cabin Operators in New Hampshire."
- 19 BOWRING, JAMES R. AND AARON W. CHADBOURN, JR., "Cost and Returns for Milk Processing and Distribution in New Hampshire — 1957."
- 20 ROGERS, GEORGE B., W. F. HENRY, A. A. BROWN, E. T. BARDWELL, D. L. DEOSS, "Economies of Scale and Current Costs in New York Dressing Broilers and Fowl."

### Forestry

- 6 WALLACE, OLIVER P., "Stumpage Prices for New Hampshire 1937-1957."



## Expenditures for the Fiscal Year Ending June 30, 1958

	Federal Funds		Non-Federal
	Hatch	Regional	Funds (1)
Personal Services	\$194,539.48	\$ 30,161.05	\$141,656.07
Travel	1,685.79	2,698.04	5,449.17
Transportation	138.52	322.15	428.76
Communication Services	155.51	202.05	1,530.92
Rents and Utility Services	600.00		2,480.06
Printing and Reproduction	164.25		1,868.23
Other Contractual Services	477.42	59.50	435.96
Supplies and Materials	18,871.43	10,374.10	33,837.14
Equipment	8,562.60	4,058.94	12,992.24
Land and Structures	200.00		720.00
	<hr/> \$225,395.00	<hr/> \$ 47,875.83	<hr/> \$201,398.55

(1) This includes the following:

State Money	\$158,002.12
Research Sales	13,756.54
Other Income (Mostly Private Grants)	29,639.89
	<hr/> \$201,398.55

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